

PATENT ABSTRACTS OF JAPAN

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(54) MAT FOR WIPING SHOES

(57)Abstract:

PURPOSE: To improve dust controllability by using bulked yarn in constituting at least one side of double knitted fabrics of a mat for wiping shoes composed of the knitted fabrics of double layers, front and rear and the connecting yarn connected therewith.

CONSTITUTION: The double knitted fabrics are the knitted fabrics formed by a knitting machine having two needle bars and may be further improved in air permeability and water permeability by forming the knitted fabrics consisting of the two layers, front and rear, as the knitted fabrics having plural apertures. A polyamide and polyester of synthetic fibers having a high rapid drying property are more preferable. At least one side of such double knitted fabrics are composed of bulked yarn. While the bulked yarn is most adequately used for all of the fabrics constituting the one side, other fiber yarn, for example, monofilament yarn, multifilament yarn, spun yarn, etc., may be blended therewith preferably within a range of $\leq 30\%$. The mat has excellent properties to capture and hold dust (for example, sand and soil, oil stains, dead leaves, dust, etc.), to make the captured dust inconspicuous and to retain and restore appearance and elasticity.

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[Claim(s)]

[Claim 1] The mat for ***** which is a mat for ***** which consists of a double knit which consisted of connecting fibers which connect the knitting fabric of a front reverse side bilayer, and the knitting fabric of this bilayer, and is characterized by the knitting fabric of at least one side of this double knit consisting of textured yarns.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] this invention relates to the mat for *****.

[0002]

[Description of the Prior Art] Although the mat for ***** installed in the office door etc. has various things Especially the mat for ***** that made textured yarns, such as fluid blasting thread, pile yarn, and carried out the tuft While satisfying the demand property (henceforth dust control nature) as a mat for ***** that capture of dust (for example, earth and sand, oil dirt, a dead leaf, dust, etc.) and the dust held and caught cannot be easily conspicuous Although it excels also in the appearance of the appearance as soft floor covering material, and elastic-recovery nature and popularity is won, what was further excellent in dust control nature is demanded recently.

[0003]

[Problem(s) to be Solved by the Invention] this invention aims at offering the mat for ***** which matched this demand.

[0004]

[Means for Solving the Problem] That is, this invention is a mat for ***** which consists of a double knit which consisted of connecting fibers which connect the knitting fabric of a front reverse side bilayer, and the knitting fabric of this bilayer, and is in the mat for ***** with which the knitting fabric of at least one side of this double knit consists of textured yarns, and is characterized by the bird clapper.

[0005] The double knit used for this invention is knitting fabric formed by the knitting machine which has a biseriate needle bed, for example, can be composed of a double RASSHIERU machine, a double circular knitting machine, etc., and the knitting fabric of a front reverse side bilayer may be made into the knitting fabric which has two or more openings, such as mesh knitting fabric and MAGIZETTO knitting fabric, and may raise permeability and water permeability further. the material of the line of thread used for the knitting fabric and the connecting fiber of a front reverse side bilayer -- natural fibers, such as synthetic fibers, such as polyester (not being what is limited especially), a polyamide, and a polyacrylonitrile, a regenerated fiber, wool yarn, and cotton, -- although any are sufficient and it is not limited especially, the synthetic fiber which was rich in quick-drying is desirable, and especially a polyamide and polyester are the optimal

[0006] Although it is optimal that all the lines of thread that constitute one side are textured yarns although at least one side of this double knit is constituted from a textured yarn as for the knitting fabric of a front reverse side bilayer used for this invention, it may mix the fiber line of thread of others [30% or less of within the limits], for example, still more desirable monofilament thread, multifilament thread, spun yarn, etc. 50% or less preferably 70% or less within limits which do not spoil the purpose of this invention.

[0007] About 20-400 deniers and a total denier have still more preferably preferably 600-2000-denier 5-600-denier 800-1800 deniers [10-500-denier / 100-3000-denier]

still more preferably good [the single-yarn denier of the line of thread which there are fluid blasting thread, indentation crimp finished yarn, etc. of a monofilament or a multifilament as a textured yarn, and constitutes a textured yarn].

[0008] What is necessary is it to be common to usually carry out blasting of the line of thread with steam (25 - 70 T/m intensity carrying out throwing preferably 20 to 80 T/m if needed), and to push into card clothing as for fluid blasting thread, and just to select steam temperature, nozzle **, yarn speed, etc. suitably within a public domain conventionally. the direction which fixed especially the crimp which the potential crimp discovered and (being the so-called -- bulky -- taking out) discovered after fluid blasting since the rate of crimp extension after priming processing becomes about 20**5% and a difference with the rate (about 5 - 20%) of crimp extension before priming processing is shortened to about 1 - 10%, even if it carries out wash reproduction and uses it repeatedly, dust control nature does not change but at least five repeat use or more especially -- is desirable

[0009] specifically, it ***** and is based on the steam set (it is about 1 - 30 minutes at about 120-130 degrees C) by relaxed processing for about 1 - 10 minutes (for example, tumbling processing) it begins to be bulky and subsequently according to an autoclave etc., or a dry heat set (it is about 1 - 5 minutes at about 180-230 degrees C) by about 60-80-degree C wet heat -- what is necessary is just to crimp-fix and ***** cone rise

[0010] Moreover, 5cm, 5-the 8piece / 5cm thing is especially preferably excellent in dust control nature, and, as for indentation crimp finished yarn, the number of crimps is obtained 3-a 10piece / by these pushing in with the cross section of a pushing mouth for example, in pushing crimp processing, and adjusting a number or removing the baffle of a pushing outlet. Compared with the thing with the wide number [of general pushing crimp finished yarn / of crimps] width of face of 1-a 20piece / 5cm, and the number of crimps, the aforementioned thing has the narrow width of face of the number of crimps, the crimp has started the whole uniformly, and the mountain of a crimp and the position of a valley are carrying out simultaneously coincidence of two or more line-of-thread comrades who pushed in.

[0011] Although the triangular cross section and the flattened section whose oblateness is 1:1.5 to about 1:5 are excellent from dust control nature, variant cross sections, such as a L character type and a V character type, and circular and a square are sufficient as the fiber cross section of the line of thread which constitutes the knitting fabric of a front reverse side bilayer, and the hollow cross section whose rate of hollow is about 10 - 30% is sufficient as it. moreover, the need -- responding -- a pigment, a light-fast improver, and yellowing -- various additives, such as an inhibitor, could be made to contain

[0012] A single-yarn denier in order to obtain moderate elasticity and rebounding nature about a connecting fiber In addition, 50-2000 deniers, A 200-2000-denier monofilament or a multifilament is preferably desirable. The number of the connecting fiber in 5 square centimeters is especially set to N (a book / 5cm²). When the specific gravity of D (g/9x10⁵ cm) and a connecting fiber is set to rho (g/cm³) for the denier of a connecting fiber, the gross area (N.D/9x10⁵, and rho) of the connecting fiber in the 5 square centimeter of double knits -- 0.05-5.0cm² -- desirable -- 0.1-2.0cm² it is -- ** -- It excels in a loft, elasticity and permeability, and flood nature, and excels also in the balance, and will become the optimal as a mat for *****. 0. 05cm² At the following, elasticity is 2 5.0cm. If it exceeds, permeability and water permeability will tend to fall.

[0013] A connecting fiber may form a loop-like stitch into the knitting fabric of a

front reverse side bilayer, and the structure hooked on the knitting fabric of a front reverse side bilayer in the shape of a tuck organization is sufficient, that what is necessary is just to have tied up the front back fabric in short, if needed, it may incline and arrange or it may arrange [crosses in the shape of X, and] a connecting fiber. the thickness and the eyes of a double knit -- hope -- responding -- suitably -- selecting -- ****ing -- for example, thickness -- about 3-30mm -- desirable -- about 5-15mm and eyes -- 500 g/m² - 2.5 kg/m² a grade -- desirable -- 1.0 - 2.0 kg/m² Grade ** is desirable. Moreover, if needed, it may judge in desired size, or the piece of knitting fabric after decision may be made into a desired configuration by sewing or thermoforming, and a double knit may use it.

[0014] In order to produce a ***** mat using the double knit of this invention, back processing by rubber processing of 1-3mm thick intensity and rinsing (hot water rinsing), dehydration, and dryness are usually given after pre coating by nitril butadiene rubber etc. The temperature in these processes, especially time, etc. are not restricted. As for the ***** mat of this invention, it is desirable from dust control nature to use by using as a front face the field which used the textured yarn.

[0015]

[Example] Hereafter, an example explains this invention concretely. Practical use evaluation of a ***** mat used as the front face the field which used the textured yarn, was put on the office door for one month, and carried out the visual-sense judging of prehension of dust control nature, i.e., dust, maintenance, and the ease of being conspicuous.

[0016]

[Example 1] As the connecting fiber from the reed of two sheets located in the middle using the double RASSHIERU machine which equipped the six-sheet reed. As thread for table knitting fabric from the reed which supplies 440d nylon 6 monofilament thread, and is located in the front face of a knitting machine, and a tooth back and whose number is two respectively The fluid blasting thread (what carried out crimp fixation with bulky **** after card clothing blasting by steam) of the 1300d/f [68] Nylon 66 multifilament of the flattened section of the degree 1:4 of flatness as thread for back fabrics 420d/f [70] Nylon 66 multifilament thread is supplied, and they are the thickness of 10mm, and eyes 800 g/m². The double knit was obtained. the gross area of the connecting fiber per 5 square centimeters of this double knit -- 0.2cm² it was .

[0017] Back processing was performed for the obtained double knit by the conventional method, and the mat for ***** was produced. The dust control nature of the obtained ***** mat was excellent.

[0018]

[The example 1 of comparison] Back processing and pile restoration processing were performed for the following tuft ground which used for pile yarn the fluid blasting thread of the 1300d/f [68] Nylon 66 multifilament used in the example 1 by the conventional method, and the mat for ***** was produced.

Tuft condition detail 1 / 8 gage, a level cut & loop, pile length (13mm of cut sections, 9mm of loop sections)

Stitch = the dust control nature of 6.8 stitches / inch, and the ***** mat obtained eyes = 770 g/m² was inferior compared with the example 1.

[0019]

[The example 2 of comparison] As thread for front knitting fabric, the mat for ***** was produced like the example 1 except having used the raw thread of the 1300d/f [68] Nylon 66 multifilament. The dust control nature of the obtained ***** mat was

inferior compared with the example 1.

[0020]

[The example 3 of comparison] As thread for front knitting fabric, the mat for ***** was produced like the example 1 except having used 1/10Nm ring spun yarn. The dust control nature of the obtained ***** mat was inferior compared with the example 1.

[0021]

[Example 2] The mat for ***** was produced like the example 1 except having used the fluid blasting thread of the thread which lengthened two 1300d/f [4] Nylon 66 multifilament thread dope dyed yarns of a triangular cross section, arranged them as thread for front knitting fabric, and carried out 50 T/m throwing in the direction of S. The dust control nature of the obtained ***** mat was excellent like the example 1.

[0022]

[Example 3] The 1300d/f [56] Nylon 66 multifilament thread which carried out 220 T/m throwing in the direction of S as thread for front knitting fabric, The mat for ***** was produced like the example 1 except having used what stuffed into the Z direction the thread which lengthened and arranged two 1300d/f [56] Nylon 66 multifilament thread, and carried out 220 T/m throwing in the direction of S according to the following using the plied yarn which *(ed) on 220 T/m, and carried out crimp processing.

[0023] The dust control nature of the obtained ***** mat was excellent like the example 1.

FURIZE tone continuation set processing was given using the pushing crimp finishing machine made from indentation crimp processing condition SUPERBA (TVP, with MF<Method of Fricze> equipment). It is the cross section of a pushing mouth 5cm in that case 2 It set up, and was set as 18 pushing numbers, and the baffle of a pushing outlet was removed and processed. 6-a 8piece / 5cm, and the width of face of the number of crimps of the finished yarn after crimp processing were narrow.

[0024]

[Effect of the Invention] The mat for ***** of this invention is excellent in dust control nature as compared with the conventional thing.

Translation of Japanese Unexamined Patent Application

SHOE-WIPING MAT

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Abstract

OBJECT: To provide a shoe-wiping mat having excellent dust control properties.

CONSTITUTION: A shoe-wiping mat formed from a double knit fabric comprising two layers (front and back) of knit fabric, and connecting yarn connecting these two layers of knit fabric, and characterised in that the knit fabric of at least one side of the double knit fabric comprises bulked yarn.

Claim

1. A shoe-wiping mat formed from a double knit fabric comprising two layers (front and back) of knit fabric, and connecting yarn connecting said two layers of knit fabric, said shoe-wiping mat being characterised in that the knit fabric of at least one side of said double knit fabric comprises bulked yarn.

Detailed Description of the Invention

Industrial field of application

(1) The present invention relates to shoe-wiping mats.**

Related art

(2) There are diverse kinds of shoe-wiping mat of the sort which is placed for example at the entrance of an office. Tufted shoe-wiping mats in particular, wherein a bulked yarn such as a fluid-jet textured yarn is used to create a pile, are favourably regarded. This is because such mats amply provide the characteristics demanded of shoe-wiping mats in general – namely,

* Numbers in square brackets refer to Translator's Notes appended to the translation.

** Numbers in round brackets prefixing paragraphs correspond to paragraph numbers in the Japanese document.

capture and retention of dirt (e.g., soil and sand, oily dirt, dead leaves, dust, etc.) plus the ability to render captured dirt inconspicuous (hereinafter, these characteristics are termed "dust control properties") – and also offer excellent external appearance (i.e., they look good as soft floor coverings) plus excellent elastic recovery. Nevertheless, demand has recently arisen for shoe-wiping mats with even better dust control properties.

Problem which the invention will solve

(3) It is an object of the present invention to provide a shoe-wiping mat which meets this demand.

Means for solving problem

(4) Specifically, the present invention is a shoe-wiping mat formed from a double knit fabric comprising two layers (front and back) of knit fabric, and connecting yarn connecting these two layers of knit fabric, this shoe-wiping mat being characterised in that the knit fabric of at least one side of the double knit fabric comprises bulked yarn.

(5) The double knit fabric used in the present invention is a knit fabric formed on a knitting machine having two needle beds [2], and can be knitted for example on a double Raschel machine or a double circular knitting machine. The air and water permeability of the two layer (front and back) knit fabric may be further improved by forming a knit fabric with a plurality of openings, such as mesh or marquisette. The fibrous material used for the two-layer (front and back) knit fabric and for the connecting yarn may be a synthetic or regenerated fibre such as a polyester, a polyamide or a polyacrylonitrile (there are no particular restrictions here), or a natural fibre such as wool or cotton. Although there are no particular restrictions, a synthetic fibre with excellent quick-drying properties is preferable, and polyamides and polyesters are most suitable.

(6) The two-layer (front and back) knit fabric used in the present invention is one in which at least one side of the double knit fabric described above is made from bulked yarn, and optimally all the fibres comprising this one side are bulked yarn. However, other fibres such as for example monofilament yarn, multifilament yarn and spun yarn may be admixed within a range that does not adversely affect the attainment of the object of the present invention – for example, within a range up to 70%, and preferably up to 50%, and more preferably up to 30%.

(7) The bulked yarn is for example a monofilament or multifilament fluid-jet textured yarn or stuffer-box crimped yarn. The single-yarn denier of the fibres comprising the bulked yarn is 5–600, preferably 10–500, and more preferably 20–400; and the total denier is 100–3000, preferably 600–2000, and more preferably 800–1800.

(8) Fluid-jet textured yarn is commonly obtained by steam-jet texturing fibres (twisting the fibres at 20–80 T/m, and preferably at 25–70 T/m, if required [3]) and pushing them into card clothing. [4] Steam temperature, nozzle pressure, yarn speed etc. may be appropriately selected within conventionally practised and known ranges. After the fluid-jet texturing it is preferable to develop the latent crimp (so-called bulking) and to set the developed crimp. This results in the crimp elongation after boiling water treatment becoming $20\pm 5\%$, and in the difference between this and the crimp elongation prior to boiling water treatment (5–20%) being reduced to 1–10%. [5] As a result, the dust control properties do not change despite repeated cycles of use and washing (specifically, despite 5 or more such repetitions).

(9) More specifically, and by way of example, after hanking, bulking is carried out by relaxation (e.g., by tumbling) for 1–10 minutes in wet heat at 60–80°C, followed by crimp setting, either by steam setting (at 120–130°C for 1–30 minutes) or by dry-heat setting (at 180–230°C for 1–5 minutes) using an autoclave or the like. Finally, hank-to-cone winding is carried out.

(10) Stuffer-box crimped yarn with 3–10 crimps/5cm and preferably 5–8 crimps/5cm gives outstanding dust control properties, and can be obtained by for example adjusting the sectional area of the stuffer-box inlet and the number of yarns fed to it, and by removing the baffle plate at the stuffer-box outlet. Whereas the number of crimps in ordinary stuffer-box crimped yarn has a wide range of 1–20/5cm, the number of crimps in the stuffer-box crimped yarn used in the present invention has a narrow range, with crimping being applied more uniformly overall. Moreover, the peaks and valleys of the crimps of the plural number of yarns that have been pushed in a group into the stuffer-box are substantially aligned.

(11) Excellent dust control properties are obtained if the fibres forming the two-layer (front and back) knit fabric have a triangular section with a flatness of from 1:1.5 to 1:5. However, an odd-shaped cross-section such as an L-shape or a V-shape, or a circular or square section are also feasible, and the fibre may have a percentage cross-sectional hollowness of 10–30%. It is also feasible to include various additives such as pigment, light-fastness improver and anti-yellowing agent, as occasion demands.

(12) Note that to obtain a suitable degree of elasticity and resilience, the connecting yarn is preferably a monofilament or multifilament with a single-yarn denier of 50–2000, and preferably of 200–2000. In particular, writing N for the number of connecting yarns in five square centimetres (yarns/5cm²), D for the denier of the connecting yarn (g/9×10⁵ cm) and ρ for the specific gravity of the connecting yarn (g/cm³), a mat which is optimum as a shoe-wiping mat, having excellent bulkiness, elasticity, and air and water permeability, and an

excellent balance of these properties, is obtained if the total cross-sectional area of the connecting yarn in five square centimetres of the double-layer knit fabric ($N \cdot D/9 \times 10^5 \cdot \rho$) is 0.05–5.0 cm² and preferably 0.1–2.0 cm². If this total cross-sectional area is less than 0.05 cm², elasticity tends to decrease, while if it exceeds 5.0 cm², air and water permeability tend to decrease.

(13) The connecting yarn may form loop-shaped stitches within the two-layer knit fabric or may hook around the two-layer knit fabric in a tacking structure. The essential point is that the front and back knit fabrics should be linked together. If required, it is also feasible to arrange the connecting yarn obliquely, or to arrange it so that it forms X-shaped intersections. The thickness and weight per unit area of the double knit fabric may be selected as desired. The thickness is for example 3–30 mm and preferably 5–15 mm, and the weight per unit area is 500 g/m²–2.5 kg/m², and preferably 1.0–2.0 kg/m². The double knit fabric may be cut to a desired size if required, or pieces of knit fabric obtained by cutting may be made into a desired shape by sewing or thermoforming.

(14) The usual way of manufacturing a shoe-wiping mat using the double knit fabric of the present invention is to pre-coat with nitrile butadiene rubber or the like, followed by application of a rubberized backing of 1–3 mm thickness, followed by rinsing (in hot water), water removal and drying. There are no particular restrictions on the temperatures or durations employed in these steps. With the shoe-wiping mat of the present invention, using the side made from bulked yarn as the top surface is preferable from the point of view of obtaining good dust control properties.

Embodiments

(15) The present invention is described in greater detail below by way of embodiments. Practical evaluation of shoe-wiping mats involved placing a mat with the side made from bulked yarn uppermost for one month at the entranceway of an office [6], and visually judging the dust control properties – namely, how well the mat captured and held dirt, and how conspicuous such dirt was.

Embodiment 1

(16) Using a double Raschel machine equipped with six yarn guides, 440 denier Nylon 6 monofilament yarn was supplied as the connecting yarn from two mid-positioned yarn guides. 1300d/68f Nylon 66 multifilament yarn with flat cross-section (degree of flatness 1:4) was subjected to fluid-jet texturing (steam-jet texturing through card clothing [7], followed by developing the latent crimp and crimp setting), and the resulting fluid-jet textured yarn supplied as the yarn for the front knit fabric layer; and 420d/70f Nylon 66 multifilament yarn

was supplied as the yarn for the back knit fabric layer. These two yarns were each supplied from two yarn guides, the two pairs of yarn guides being respectively positioned at the front and rear of the knitting machine. A 10 mm thick, 800 g/m² double knit fabric was thereby obtained. The total cross-sectional area of the connecting yarn per five square centimetres of this double knit fabric was 0.2 cm².

(17) A shoe-wiping mat was manufactured by applying a backing by a conventional method to the double knit fabric obtained. The dust control properties of the shoe-wiping mat obtained were excellent.

Comparison 1

(18) A shoe-wiping mat was manufactured by employing conventional methods to apply backing to, and to restore the pile of, the tufted fabric described below, in which the pile yarn used was the 1300d/68f Nylon 66 multifilament fluid-jet textured yarn used in Embodiment 1.

Tufting conditions

1/8 gauge, level cut & loop

pile length: 13 mm in cut portions, 9 mm in loop portions

stitches: 6.8 stitches/inch, weight: 770 g/m²

The dust control properties of the shoe-wiping mat obtained were inferior to those of Embodiment 1.

Comparison 2

(19) A shoe-wiping mat was manufactured in the same manner as in Embodiment 1, other than that 1300d/68f Nylon 66 multifilament raw yarn was used as the yarn for the front knit fabric layer. The dust control properties of the shoe-wiping mat obtained were inferior to those of Embodiment 1.

Comparison 3

(20) A shoe-wiping mat was manufactured in the same manner as in Embodiment 1, other than that a 1/10 Nm [8] ring spun yarn was used as the yarn for the front knit fabric layer. The dust control properties of the shoe-wiping mat obtained were inferior to those of Embodiment 1.

Embodiment 2

(21) A shoe-wiping mat was manufactured in the same manner as in Embodiment 1, other than that a fluid-jet textured yarn based on two triangular section 1300d/4f Nylon 66 multifilament dope-dyed yarns which were doubled and then twisted in the S direction at 50 T/m, was used as the yarn for the front knit fabric layer. The dust control properties of the shoe-wiping mat obtained were, like those of the Embodiment 1 mat, excellent.

Embodiment 3

(22) A shoe-wiping mat was manufactured in the same manner as in Embodiment 1, other than that a plied yarn to which a final twist of 220 T/m in the Z-direction had been applied was stuffer-box crimped as described below and used as the yarn for the front knit fabric layer. This plied yarn itself comprised a 1300d/56f Nylon 66 multifilament yarn twisted at 220 T/m in the S direction and a yarn obtained by doubling two 1300d/56f Nylon 66 multifilament yarns and twisting them at 220 T/m in the S direction.

(23) The dust control properties of the shoe-wiping mat obtained were, like those of the Embodiment 1 mat, excellent.

Stuffer-box crimping conditions

Continuous setting with friezing was carried out using a stuffer-box crimping machine made by SUPERBA (a TVP fitted with an MF friezing machine). The sectional area of the stuffer-box inlet was set to 5 cm², the number of yarns fed to it was set to 18, and the baffle plate at the stuffer-box outlet was removed. The number of crimps in the processed yarn after crimping was in a narrow range of 6–8 crimps/5cm.

Advantageous effects of the invention

(24) The shoe-wiping mat of the present invention is superior in dust control properties to conventional mats.

TRANSLATOR'S NOTES

1. The official name of the company changed to "Asahi Kasei Corporation" on 1 January 2001.
2. Also known as a "double needle bar knitting machine".
3. The Japanese text does not make it clear whether such twisting is performed concurrently with or prior to the steam-jet texturing.
4. Card clothing is the material used to cover the working surfaces of a carding machine.
5. Sic. This is a faithful translation of the Japanese, but the actual numerical values given do not make obvious sense.
6. The Japanese text does not clarify the details of such *in-situ* evaluation: i.e., there is no indication of whether mats were tested concurrently or successively, or of whether they were tested at one or at several locations.
7. The Japanese which I have translated as "steam-jet texturing through card clothing" is literally, "card clothing jet texturing by steam".
8. "Nm" is the symbol for metric count, a measure of the fineness of a yarn. "Nm" expresses the length in metres per gram of yarn.